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made Pfeffer one of the most difficult writers for the foreign student, are still in evidence, but, if we judge rightly, not so emphatically in evidence as heretofore. A tendency to avoid terms which serve only to cover up our ignorance, and an attitude of mind which seeks for explanations of physiological phenomena on physical and chemical grounds, is somewhat more pronounced here than in the previous edition. A feeling of admiration and wonder must be aroused in every reader of this volume by the exceedingly broad and familiar grasp of the whole subject that is shown by the author. There seems to be no corner of the realm of physiology into which the acuteness of Dr. Pfeffer's intellect has not allowed him to find his way. This seems to us to be the strongest among the many good qualities possessed by the book, but coupled with it — perhaps necessitated by it — is a quality which is surely destined to cause much dissatisfaction and weariness of the flesh on the part of the student. We refer to the numerous cross references found on nearly every page. To get the author's whole view of any subject one must at length read a good part of the volume.

English readers will hope for the speedy appearance of a translation of this book into their own tongue, for it will surely be from now on the standard reference on the physiology of growth and irritability. All students of this subject will await with impatience the publication of the rest of the volume. — BURTON E. LIVINGSTON.

Enzymes and their applications.

IN 1898 Dr. Jean Effront,[3] of Brussels, published the first volume of an important work upon enzymes and their industrial applications. That work has recently been translated by Professor Prescott, of the Massachusetts Institute of Technology, with the desire "to make available in English the valuable material of the original French work." This volume is devoted to the enzymes which act upon carbohydrates, and to theoxidases. In addition to these, however, it includes a discussion of the glucoside and glyceride enzymes. As only one chapter is devoted to them and one to the oxidases, it will be seen that the greater part of the work is devoted to the carbohydrate enzymes.

Throughout the book the emphasis upon the industrial relations of these substances is very strong. For example, chapter 11 is devoted to the discussion of chemical transformations which accompany germination, the methods of malting, sorting, steeping, germination, and brewing. Chapter 12 is devoted to the rôle of amylase in the brewery; chapter 13 to the manufacture of maltase; chapter 14 to the fermentations which occur in bread making; and chapter 15 to the rôle of amylase in the distillery. Much attention is also devoted to methods of determining the activity of enzymes, to which Effront himself has contributed greatly, as indeed he has to the whole subject.

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[3] EFFRONT, JEAN, Enzymes and their applications. Translated by Samuel C. Prescott. Vol. I: The enzymes of the carbohydrates. The oxidases. pp. xi + 322. New York: John Wiley & Son. London: Chapman & Hall. 1902. $3.00.

Three enzymes are considered in great detail, namely, sucrase (invertase), amylase (diastase), and maltase. The most important industrial applications of maltase seem to be in the manufacture of various oriental beverages.

In several inductory chapters the author discusses the general properties, the mode of action, and the individuality of enzymes. For the general reader or the physiologist these chapters will be found the most useful. The translator adheres to the author's use of the term diastase in its general sense as a synonym of enzyme. In view of the very wide application of the word diastase to a particular group of enzymes this usage may lead to confusion. In general the translation is satisfactory, though the choice of words is not always happy, and the paragraphing might have been greatly improved upon. At the close of each chapter there is a bibliography. The incompleteness of the citations and the diverse forms used will be a source of annoyance to anyone attempting to look up references. The translator could have done good service to English readers by adopting some consistent plan of citation and supplementing the author's bibliographical work.

This book will be certain of comparison with Green's recent work on the *Soluble ferments and fermentation*. The two are written from a wholly different standpoint; in Green's work the industrial applications are only incidentally touched upon, but in those portions where comparison is possible it will hardly be to the advantage of the Effront book. The latter produces an impression of fragmentariness and incompleteness, and there is a lack of finish, all of which leave the reader without a clear-cut impression. This is no doubt due in part to the incompleteness of the subject, for in reality much remains to be discovered regarding these bodies, but part of the result named must be ascribed to the work of the author and translator.

The book, however, will be extremely useful to schools and individuals concerned with the industrial processes of baking, malting, brewing, distilling, etc., in which fermentation plays so important a part.—C. R. BARNES.

Outlines of botany.[4]

MR. LEAVITT has prepared, at the request of the botanical department of Harvard Universty, a text-book of botany for secondary schools, based upon and evidently intended to replace Gray's *Lessons in botany*, which, even in its

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[4] LEAVITT, ROBERT GREENLEAF, Outlines of botany, for high-school laboratory and class room, based on Gray's *Lessons in botany*. Prepared at the request of the botanical department of Harvard University. 8vo. pp. 272. *figs. 383*. New York: American Book Company. 1901. Also, combined with *Field, forest and garden botany*.